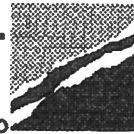


FLS miljø Inc.

100 Glenborough Drive
Houston, Texas 77067-3611 USA
Phone 281 539 3400 Fax 281 539 3411

FLS miljø Inc.

FLS miljø Group

FAX**Fax No:** 510 866 6350**Total Pages:** 5**Date:** January 23, 1997**To:** Kvaerner Davy**Attn:** Aileen Castenada**From:** Charles Leivo and Trinh Tran**Ref:** Solvay Minerals, Inc.**Subject:** Emission Design Basis for ESPs on Calciner and Dryer

Copy: Dolly A. Potter
Solvay Minerals, Inc.
Fax 307 872 6510

Reid Baumgartner
Fax 303 447 8997

According to our discussion this morning, we will call you at 1:30 PM your time today to discuss our analysis of the following data. No need to study it in advance; we'll just plan to walk you through it.

Attached are two tables, one for calciner and one for dryer, which summarize:

1. The 1994 emission test data for the existing ESPs (Dolly Potter's fax of January 16, 1997)
2. The design basis for the existing ESPs (same fax)
3. The design basis for the new ESPs
4. Some calculations for the new design basis which account for the fact that the back half condensibles will pass through the ESP without being collected. Therefore, the ESP must be designed to collect more than enough front half particulate so that when we add on the back half emissions, we will be within the overall guarantee.

Comments on 1994 Tests versus 1994 Design Basis

It should be noted that the 1994 test summary indicates the tests were conducted under conditions significantly less stringent than the design basis for the existing ESPs, and that this would result in much lower emissions than the design basis at that time:

	Calciner	Dryer
Design Volume (by ratio)	172,000 acfm	126,000 acfm
Test Volume	135,833 acfm	76,330 acfm
Test Treatment Time as % of Design	+22 %	+60 %
ESP Fields	6 tested	5 tested
Design	5 test + 1 out	4 test + 1 out
Test Fields as % of Design	+20 %	+25 %
Total Treatment Time as % of Design	+42 %	+85 %

Just for talking purposes, we would suggest that had the ESPs been tested at design flows and with the spare fields out of service, then the measured emissions would be in the range of 4 to 5 times higher than actually achieved. Not only was treatment time much higher, but also the velocity was much lower as well through the ESPs, thereby reducing any re-entrainment.

New ESP Design

For this we propose to discuss the tables, with the following in mind:

1. We must size the ESPs to be over-achievers on the front half particulate to meet the total emissions.
2. The back half condensibles will pass through the ESPs without being collected.

Therefore we need a method for commercial guarantee reasons to agree on some acceptable level of condensibles that will be present.

If you should have any composition data or information relating to the origins of the condensibles, we could perhaps make some comments as to whether or not there could be other methods to reduce them (besides ESPs).


3. The calculated front half requirements for particulate removal are low enough that they are approaching or exceeding measurement/accuracy levels for the test procedures. We will need to develop test protocol. This would relate to sample times and also to the number of samples to be taken and averaged. Furthermore, there will be some level that we will have a general discomfort level in going below for commercial reasons, not wanting to take a chance on the testing procedures. (Designing for the ESP performance is a different matter.)

Kvaerner Davy
Subject - Solvay Minerals ESP Design

FLS miljø Inc.
January 23, 1997

Following our discussions with you, we will develop sizing information for the ESPs. However, our concern is that we will be looking at the possibility of significantly larger ESPs than are already in place on the existing line.

Sincerely,


Charles Leivo


Trinh Tran

P.S. We note for now that we're carrying some modest mathematical bug in the Dryer table due to inconsistencies in the percentage compositions for acf versus dscf.

	1994 TESTS			1994 ESP		1997 ESP		Calculated Front Half to Achieve		
	TEST 1	TEST 2	TEST 3	AVERAGE	Design	Test/Dsgn Vol., %	GUARANTEE	Guarantee (same back half)		
							BASE	ALT.	BASE	ALT.
CALCINER										
Gas Conditions										
Volume	acfm	149,000	139,000	135,833						
	dscfm	47,010	44,330	43,077	54,507	79%	346,000	346,000	346,000	346,000
Temp.	F	350	352	351			92,346	92,346	92,346	92,346
Pressure	psia						500	500	500	500
H ₂ O	%	39.29%	38.50%	38.84%			11.65	11.65	11.65	11.65
				38.88%			38%	38%	38%	38%
Front Half Particulate	gr/acf	0.0006	0.0005	0.0005					0.0016	40%
Back Half Inorganic	gr/acf	0.0024	0.0036	0.0029					0.0024	60%
Total	gr/acf	0.0030	0.0041	0.0034			0.0040	0.0030	0.0040	100%
Front Half Particulate	gr/dscf	0.0018	0.0016	0.0017					0.0059	40%
Back Half Inorganic	gr/dscf	0.0075	0.0114	0.0091					0.0091	60%
Total	gr/dscf	0.0093	0.0130	0.0107	0.0200		0.0112	0.0112	0.0150	100%
Front Half Particulate	lb/hr	0.77	0.60	0.62					4.70	40%
Back Half Inorganic	lb/hr	3.07	4.29	3.34					7.18	60%
Total	lb/hr	3.83	4.88	3.96	9.34		11.87	8.90	11.87	100%
Front Half Particulate	mg/Am3			1.22					3.62	40%
Back Half Inorganic	mg/Am3			6.56					5.55	60%
Total	mg/Am3			7.79			9.17	6.87	9.17	100%

0.0016 - lower than
practical limit
to defect

50' long

SOLVAY2016_1.4_000346